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LETTER AND COMMENTS FROM U S EPA REGION IV REGARDING SAMPLING AND  
ANALYSIS PLAN OPERABLE UNIT 16 (OU16) SITE 41 NAS PENSACOLA FL  
12/18/2012  
U S EPA REGION IV



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 4  
SAM NUNN ATLANTA FEDERAL CENTER  
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December 18, 2012

Official Correspondence – This electronic message is being sent in lieu of regular mail

4SF/FFB

Ms. **Patty Marajh-Whittemore**, Remedial Project Manager,  
ITP Gulf Coast  
**Dept of the Navy; Naval Facilities Southeast**  
Attn: AJAX Street, Building 135N  
P.O. Box 30A  
Jacksonville, FL 32212-0030

Re: Operable Unit 16 – Site 41 Sampling and Analysis Plan Review

Dear Ms Whittemore:

The U.S. Environmental Protection Agency has received and reviewed the above mentioned document and has enclosed comments on the document.

EPA's review focused on two aspects the overall technical aspects of the sampling approach and also the quality assurance aspects of the sampling approach. The review comments are divided between these aspects with each aspect having general, specific and minor/editorial sections. There are some issues that overlap aspects though an effort was made to not duplicate comments. EPA has also provided a checklist used to guide the review of the quality assurance (QA) section.

Thank you for the opportunity to review this document. Should any further clarification be required, please contact me at 404-562-8510 or [woolheater.tim@epa.gov](mailto:woolheater.tim@epa.gov).

Sincerely,

Timothy R. Woolheater  
Senior Remedial Project Manager  
Federal Facilities Branch

Enclosure

CC: David Grabka, FDEP

**DRAFT SAMPLING AND ANALYSIS PLAN (SAP)**  
**WETLAND SEDIMENT SAMPLING, OPERABLE UNIT 16 — SITE 41**  
**NAVAL AIR STATION PENSACOLA**  
**PENSACOLA, FLORIDA**  
**VERSION NUMBER: 0**  
**SEPTEMBER 2012**

**REVIEW FINDINGS**

EPA's review focused on two aspects the overall technical aspects of the sampling approach and also the quality assurance aspects of the sampling approach. The review comments are divided between these aspects with each aspect having general, specific and minor/editorial sections. There are some issues that overlap aspects though an effort was made to not duplicate comments. EPA has also provided a checklist used to guide the review of the quality assurance (QA) section. It should be noted that QA issues raised in the technical review have not necessarily been indicated in this checklist.

Overall, the sampling approach presented in the SAP is mostly consistent with previous reviews and scoping sessions; however, several inconsistencies were identified. Inconsistencies are described in technical review specific comments below while several overarching concerns are presented in the technical review general comments.

The first technical review general concern is the exclusion of iron from the SAP analyte list for wetlands 4D, 15, 18A and 18B. These wetlands receive runoff and ground water discharge from the OU1 landfill where iron has been identified as a chemical of concern. Further, the results of the ecological risk assessments (ERAs) for wetlands 4D, 15, 18A and 18B located in the Final Remedial Investigation Report (RI Report)<sup>1</sup> revealed that iron was identified as a chemical of potential concern (COPC) in surface water and sediment following the refinement step of the ERAs for these wetlands. Field observations further confirms the potential impacts to wetlands receiving drainage from the OU1 landfill, yet, iron was then discounted altogether as a risk driver at the four wetlands based on the FS Tech Memo. This concern is addressed in further detail below.

EPA raises a second technical review general concern that wetland 6 has not been included for further sampling in the SAP even though participants discussed this wetland for potential sampling during scoping meetings with regards to the detections of a dichlorodiphenyltrichloroethane (DDT) in sediment and migration of this pesticide to the downgradient wetland 64 complex. This concern is addressed in further detail below.

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<sup>1</sup> Final Remedial Investigation Report, Site 41 – Operable Unit 16 – NAS Pensacola Wetlands, dated August 2005, revised November 2007.

## TECHNICAL REVIEW OF SAMPLING APPROACH

### I. GENERAL COMMENTS

1. Conversations held during the scoping meeting in March 2012 indicated that wetland 3 is currently serving as a treatment wetland for the elevated levels of iron discharging from OU1 landfill ground water. EPA also understands from the scoping meeting that the focus of future sampling within Site 41 is for sediment. However, during a field visit on September 20, 2012, EPA observed orange floc in wetland 3 and along the western back of wetland 4D which indicates that iron is likely discharging from wetland 3 to wetland 4D. EPA also observed orange floc in wetland 18B, yet iron is not included for further sampling at any of the wetlands which receive ground water discharge or runoff from the OU1 landfill. Based on a review of the RI Report, iron was identified as a COPC in surface water and sediment in wetland 4D based on the refinement step of the ERA. The RI Report also identified iron as a COPC in surface water and sediment for OU1 wetlands 15, 18A and 18B. The conceptual site models presented in the SAP for OU1 wetlands 4D, 15, 18A and 18B all indicate that the potential release mechanisms to these wetlands are migration pathways associated with the OU1 landfill; however, iron is not identified for further sampling at any of the OU1 wetlands in surface water or sediment. Because iron has historically exceeded the applicable or relevant and appropriate requirements (ARARs) in wetland 3 and was identified in all OU1 wetlands as a COPC in surface water and sediment following the refinement step of the ERA, EPA requests that iron be included for further sampling in the SAP to include all OU1 wetland surface water and sediment.
2. The SAP indicates that only sediment will be sampled for chemical analyses while only water quality parameters are being analyzed for surface water (e.g., pH, specific conductance, salinity, temperature, and dissolved oxygen). The basis for only sampling sediment for chemical analyses has not been provided. EPA previously recommended<sup>2</sup> during the technical review of the sampling approach<sup>3</sup> that additional water samples be collected because the historic samples are so dated, as far back as 1994. Both EPA and the Florida Department of Environmental Protection (FDEP) have suggested the addition of investigating this medium in prior meetings and through written comments. In addition, the food-chain modeling (FCM) presented in Appendix C of the SAP indicates the aquatic receptors are exposed to surface water and sediment through ingestion, further supporting the need to collect surface water samples. Include surface water samples for chemical analysis as part of the SAP; it is not necessary to collect water samples at every sediment sampling location; water samples could be collected at a subset of stations.
3. Throughout the SAP discrepancies exist regarding the analyte list to be included for chemical analysis for each site. For some sites, specific metals and specific organic compounds are being proposed for analysis while for other wetlands a full scan of metals and full scan of

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<sup>2</sup> EPA's June 28, 2012 Review of the of the Technical Memorandum, Sampling Approach for Collection of Additional Sediment Samples, Operable Unit 16, Site 41 Combined Wetlands Naval Air Station Pensacola, Pensacola, Florida, April 2012.

<sup>3</sup> Technical Memorandum, Sampling Approach for Collection of Additional Sediment Samples, Operable Unit 16, Site 41 Combined Wetlands, Naval Air Station Pensacola, Pensacola, Florida, April 2012.

semivolatile organic compounds (SVOCs) are proposed for analysis in sediment samples. For example, in Worksheet 10 on page WS10-12 sediment samples at Wetland 5A will be analyzed for “metals” plus tin, polychlorinated biphenyl compounds (PCBs), polycyclic aromatic hydrocarbons (PAHs), bis(2-ethylhexyl)phthalate (BEHP), and pesticides dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE), and dichlorodiphenyltrichloroethane (DDT); however it is unclear if “metals” suggest analyzing for the full scan of metals. In Worksheet 18 on page WS18-3, it appears that sediment samples at 5A will be analyzed for the whole target analyte list (TAL) for metals and target compound list (TCL) for SVOCs which include more constituents than stated in Worksheet 10, page WS 10-12. Another example involves wetland 12 (Worksheet #10, page WS 10-16) where the conceptual site model indicates that pesticides are of concern in sediment, yet worksheet 18 (Page WS18-4) shows that only pesticides DDD, DDE, and DDT are being included for analysis. The SAP requires consistency between worksheets 10 and 18 to ensure clear justification for selecting an abbreviated list of analytes for most wetlands yet including full scan analyses for others when determining the vertical and horizontal extent of contamination.

4. The SAP does not address any sampling at wetland 6 even though the scoping sessions and field observations support the need for additional sediment sampling at this wetland. According to the scoping meetings held in March and May of 2012, the meeting minutes in Appendix A and B of the SAP, and field observations of the wetland on September 20, 2012, wetland 6 was still proposed as a potential candidate for sampling. Wetland 6 has been historically associated with elevated DDT concentrations in sediment and this wetland discharges directly into the wetland 64 complex. On the March 2012 scoping meeting the Navy indicated they would consider wetland 6 for resampling pending field verification of potential sources (see Appendix A for this documentation). During the May 2012 scoping a participant inquired to see if field verification of potential DDT sources to wetland 6 had been completed. The Navy indicated no sampling was proposed for wetland 6, but a final decision would be made pending field verification (see Appendix B). Further, the Navy indicated that based on some drawings, it appeared that sediment was excavated from the wetland; however, the Navy agreed to take some photos of the area to see if any sediment is present. They also stated that samples in the ditch may be included in the SAP to confirm that DDT is not migrating to the downgradient wetland 64 complex. It should be noted that EPA and the FDEP visited wetland 6 on September 20, 2012, and observed that wetland 6 is only partially lined by cement tiles with the rest of the drainage composed of exposed sediment. Furthermore, during this visit wetland 6 had flowing water and little vegetation, but the area appeared to serve as a habitat for fish, crab, frogs and birds that feed on aquatic prey. Based on the scoping sessions and field observations, EPA requests that wetland 6 be included for further sampling in the SAP.
5. The SAP will include the analysis of acid volatile sulfide and simultaneously extracted metals (AVS/SEM) to support the evaluation of potential bioavailability of metals in sediment. However, the SAP does not specifically explain how the results of AVS/SEM will be used and how they will be interpreted. During the May 9, 2012 partnering call, EPA inquired how the AVS/SEM results would be utilized in the ecological evaluation and the Navy contractor indicated that if certain metals exceed preliminary remedial goals (PRGs), the

AVS/SEM results would be used to demonstrate whether those metals are bioavailable or not. If the AVS/SEM data indicate the metals are not bioavailable, this information would be used to support that toxicity testing would not be needed. Inclusion of the rationale for conducting AVS/SEM as reflected in the meeting minutes for the May 9, 2012 (Appendix B of the SAP, page 6) should be included in SAP to clearly explain the rationale and for the AVS/SEM sampling and analyses. It must be noted that AVS/SEM is a predictive tool for the toxicity of five divalent metals (i.e., cadmium, nickel, copper, lead and zinc) in sediment. Silver has also been included as a SEM. The AVS/SEM approach does not account for the toxicity of chemicals that may be present in the sediment. Therefore, its usefulness at the site may be limited, unless the above six metals are the only chemicals of concern for the particular wetlands.

6. The conceptual site models (CSMs) Figures 10-2 through 10-9 (pages WS 10-5 through WS 10-18) are incomplete as the CSMs assume that benthic invertebrates are the only receptors at risk. Because benthic invertebrates are a food for fish and fish are a source of food for birds and mammals, these latter receptors also need to be addressed by the CSMs, in both the text and within the associated figures. Further, due to the presence of iron in surface water at concentrations above applicable or relevant and appropriate requirements (ARARs), aquatic receptors such as fish and aquatic invertebrates also are receptors to be addressed in the CSMs. Revise CSMs to include all possible aquatic and terrestrial receptors in support of the SAP; the CSMs can always be revised as part of the ecological risk evaluation once data are available that support excluding the evaluation of specific receptors.
7. A portion of EPA's Uniform Federal Policy for Quality Assurance Plans Guidance (UFP-QAPP guidance) has been updated; specifically Part 2A Work book of the UFP-QAPP guidance was revised in March of 2012<sup>4</sup>. The original 37 work sheets have now been optimized into 27 work sheets. It is recommended, though not required, that the most current version of the UFP-QAPP work sheets be used on work plans.
8. The SAP references the wetland 64 complex throughout the document; however, that the complex comprises wetlands 7, 8 and 64 is not described in the main text of the SAP. Although the complex is illustrated in Figure 10-7 and described in Appendix A, a description of the wetland 64 complex should be included in the main body of the SAP to promote clarity that this area really comprises three wetlands. This could be accomplished in the existing Section 10.4.2, Wetland 64 Complex.
9. Based on a review of the Final RI in support of the review of the SAP, wetland W2 was identified as a wetland that is recommended for further sampling. Wetland W2 is located northeast of the airfield and it does not appear to have been fully sampled. Three samples were taken on the branch that leads from Redoubt Bayou south to the corner of the L shape of wetland W2 however the western extent of the wetland has not been sampled to determine potential impacts from Sites 5 and 6 and 16a. It is recommended that the western reach of

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<sup>4</sup> Uniform Federal Policy for Quality Assurance Project Plans Evaluating, Assessing, and Documenting Environmental Data Collection and Use Programs, Part 2A: UFP-QAPP Workbook, March 2012.  
<http://www.epa.gov/fedfac/documents/qualityassurance.htm>.

wetland W2 that is adjacent to the airfield and Sites 5, 6, and 16a be sampled to determine if these Sites may have impacted this wetland.



Note: Green dots are previous samples  
Source: Final Remedial Investigation Report, Site 41 – Operable Unit 16 – NAS Pensacola Wetlands, dated August 2005, revised November 2007

## II. SPECIFIC COMMENTS

1. *Sampling and Analysis Plan (SAP) Worksheet #6, Communication Pathways, pages WS 6-1 through WS 6-3*
  - a. The header on pages WS 6-1 through 6-3 indicate that this worksheet is SAP Worksheet #7 when it should read Worksheet #6.
  - b. Communication drivers are not included for issues associated with toxicity tests, data validation, and data verification. Document the issues and associated information requirements in Worksheet #6 to promote clarity on the communication pathways for these activities.
2. *Sampling and Analysis Plan (SAP) Worksheet #10, Conceptual Site Model*
  - a. Section 10.2 Previous Investigation Findings, Page WS 10-4: During the May 2012 scoping meeting, participants agreed on two items to be included in the SAP: 1) the rationale for only focusing only benthic receptors and 2) a decision tree would be included to address how the issue of high concentrations of chemicals like DDT will be addressed if detected (e.g., a food chain model). Neither of these items is reflected in the SAP. The SAP should be revised to include these two items.
  - b. Section 10.3.2 Wetland 4D, Page WS 10-5: This section indicates that wetland 4D receives freshwater from surface water discharges from wetland 3 from the west, but iron is not proposed for sampling. Wetland 3 is known to be impacted by very elevated levels of iron as noted in the RI and observed in the field on September 20, 2012, wetland. Further, iron was identified as a COPC in surface water and sediment at wetland 4D following the refinement step of the ERA in the Final RI. EPA requests sampling for iron in surface water and sediment for wetland 4D at the western bank area to evaluate the potential impacts on surface water discharge from wetland 3.
  - c. Section 10.3.3 Wetland 15, Page WS 10-8: This section indicates that the potential primary release mechanisms at Wetland 15 may include runoff and shallow-ground water

outflow from OU1 landfill and the golf course. The RI identified iron as a concern in ground water from OU1 landfill as well as a surface water and sediment COPC at wetland 15 following the refinement step of the ERA, thus, it is unclear why iron is not included in the analytical suite proposed for wetland 15. Include iron in the analytical suite for this wetland for both surface water and sediment or provide additional detail why iron is no longer considered a concern for this wetland. In addition, it is recommended that pH also be measured at this wetland to describe the acidity or alkalinity of the surface water.

- d. Section 10.3.4 Wetland 18A, Page WS 10-8: This section indicates that the potential primary release mechanisms may include runoff and shallow-ground water outflow from OU1 landfill seeping into the wetland. The RI identified iron as a concern in ground water from OU1 landfill as well as surface water and sediment COPCs at wetland 18A following the refinement step of the ERA. Thus, it is unclear why iron is not included in the analytical suite proposed for wetland 18A. Include in the analytical suite for this wetland for both surface water and sediment or provide additional detail why iron is no longer considered a concern for this wetland.
- e. Section 10.3.5 Wetland 18B, Page WS 10-10: This section indicates that the potential primary release mechanisms may include OU1 landfill constituents via inflow from wetland 18A. The RI identified iron as a concern in ground water from OU1 landfill as well as surface water and sediment COPCs at wetland 18B following the refinement step of the ERA. Thus, it is unclear why iron is not included in the analytical suite proposed for wetland 18B. Include in the analytical suite for both surface water and sediment for this wetland or provide additional detail why iron is no longer considered a concern for this wetland.
- f. Section 10.4.2 Wetland 64 Complex, Page WS-10-14: This section utilizes the acronym SIM however; it has not been spelled out previously. To promote clarity in the document it is recommended that all acronyms be spelled out upon first mention.
- g. Section 10.6 Wetland 48 Conceptual Site Model, Page WS-10-16: This section indicates that although a jet fuel spill occurred in 1983 that has likely impacted the site, a discussion associated with possible sources that may be the cause of the elevated pesticide concentrations (e.g., DDD, DDE, and DDT) and metals has not been provided (e.g., historical weed control along fence line, etc.). Further, this section states that the primary release mechanisms include surface water and groundwater transport from Site 37 fuel farm and former fuel spill, however, a surface release is not consider surface water transport. Figure 10-9 also shows surface water runoff as a release mechanism when the figure actually is showing surface runoff from the jet fuel spill area to surface water. This section should discuss the uncertainties associated with the conceptual understanding of the site and revise the CSM in figure 10-9 to include possible sources of pesticide and metals contamination. In addition, to promote clarity, this section should describe the primary release mechanisms as surface runoff and ground water transport. Further this section needs to include a discussion of the data gaps that will be addressed

by the proposed sampling activities as has been done on CSM discussions in previous sections.

3. *SAP Worksheet #11, Project Quality Objectives/Systematic Planning Process Statements*

- a. Section 11.3 Inputs to Problem Resolution, Page WS 11-2: According to Section 11.1 Problem Statement (Page WS 11-1), data are needed to further characterize the horizontal and/or vertical extent of contamination in sediments, and that information should be used to update an assessment of ecological and human risk. However, according to section 11.3 data will be used for ecological screening and potentially may be used for food chain modeling; this section does include using the data for human risk assessment. Further, neither Section 11.3 nor other sections of the SAP include how the ecological risk assessment, food-chain evaluations, or human health risk assessment will be conducted. Revise the SAP to address how the data collected will be used for these evaluations and assessments.
- b. Section 11.3 Inputs to Problem Resolution, Page WS 11-3: According to Section 11.3, AVS/SEM analysis will be used to evaluate the potential bioavailability of metals in sediment; however, this section does not specify which metals to which this method applies. According to EPA risk assessment guidance for evaluating metals <sup>5</sup> the proposed method for predicting the direct toxicity of mixtures of cationic metals in sediments to benthic organisms using the sum of ( $\Sigma$ )SEM-AVS approach is limited to six cationic metals (cadmium, copper, lead, nickel, silver and zinc). It is recommended that Section 11.3 be revised to specify which metals the AVS/SEM method will address in the SAP. Further, this section does not explain how the AVS/SEM results will be used in the ecological risk evaluation. It is recommended that the rationale for conducting AVS/SEM as reflected in the meeting minutes for the May 9, 2012 (Page 6 of Appendix B of the SAP) be included in SAP to clearly explain the rationale for the AVS/SEM sampling and analyses.
- c. Section 11.3 Inputs to Problem Resolution, Page WS 11-3: The SAP indicates that sediment samples will be analyzed for organic carbon yet it is unclear why the organic carbon content of the sediment is not being considered when evaluating SEM/AVS data. Organic carbon is important with the partitioning phase in sediments. The SAP should clarify why organic carbon is not being considered in the evaluation of the SEM/AVS data, or consider using the organic carbon (foc) (e.g., ( $\Sigma$ SEM-AVS)/foc).
- d. Section 11.5 Analytical Approach, Page WS 11-7: Decision Rule #5 to support the analytical approach states that if concentrations of bioaccumulative contaminants are greater than historic maximum sediment concentrations in the 2007 RI, then food chain models may be conducted. This suggests that there may be instances where food chain models will not be conducted even though concentrations of bioaccumulative contaminants are greater than the historic maximum, but a decision rule or approach has not been provided to support this condition. The SAP should clarify the condition where

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<sup>5</sup> EPA's Framework for Metals Risk Assessment EPA 120/R-07/001, March 2007.

a food-chain model would not be conducted even if the historic maximum is exceeded in the proposed sampling effort.

- e. Section 11.5.1 Sediment Toxicity Testing, Page WS 11-7: The last paragraph on Page WS 11-7 and continuing on to Page WS 11-8 is unclear as to the purpose of lab control samples. Early in the paragraph it is stated that lab control samples are used to see if the test method is acceptable; however, later, paragraph indicates that laboratory controls are used to determine if toxicity is significantly different from the toxicity results obtained from the testing laboratory. It appears that relative toxicity should be evaluated against reference locations rather than lab control samples. Address this discrepancy by differentiating the purpose of laboratory control samples from reference samples in this section. Further, this section states that “the laboratory will compare freshwater testing results to results for sediments collected from designated reference areas to determine if the toxicity observed differs from toxicity that may occur in areas that are not affected by the wetland being evaluated”; however, previously it was stated that only sediment samples will be collected. It appears that this section may be referring to sediments collected from freshwater sediments which will be compared to reference areas. Finally, this section does not discuss the analytical parameters that will be used on the samples collected for toxicity. According to agreements at the March 27 and 28, 2012 technical meeting, those samples used for toxicity testing should receive full scan analyses. Address this discrepancy concerning how the results of the reference wetlands will be used in evaluating potential sediment toxicity and state that for those samples requiring toxicity tests that here will also be full scan analyses.
  - f. Section 11.6 Performance Criteria, Page WS 11-8: This section only describes performance criteria and does not include acceptance criteria. To be complete, acceptance criteria need to be addressed.
  - g. Section 11.6 Performance Criteria, Page WS 11-10: The section subtitled “Managing Laboratory Sampling Error” states that control of potential laboratory error and sampling error will be minimized using spikes, blanks, and duplicates. However, a reference to the information that describes how these samples will be used to manage laboratory sampling error has not been provided. To understand how laboratory sampling error will be managed, this section requires further clarification either with a specific reference where the appropriate protocol can be located or include a discussion on how laboratory sampling error will be managed.
- 4. *SAP Worksheet #13, Secondary Data Criteria and Limitations Table, Page WS 13-1*: This table shows that there are no limitations on the use of historical data when comparing this data to new data. However, limitations may exist especially if historical data is so old that the analytical methods may have changed or detection limits have become more sensitive to name a few. Limitations of using historical data in the comparison to new data are recommended since uncertainties may be high in use of data dating back as far as 1994.
  - 5. *SAP Worksheet #14, Summary of Project Tasks, Page WS 14-1*: This worksheet is incomplete because it does not include the following information:

- a. Project deliverables/reports for each field task are not described. Note the only deliverable identified is an Addendum to the Remedial Investigation; however, additional deliverables and their location are not identified (e.g., calibration logs, health and safety certifications, etc.)
- b. Planned start dates for each task have not been presented.
- c. Toxicity Testing has not been included as a possible project task.
- d. Data review and handling of toxicity test data is not provided.
- e. Data qualifiers proposed to be used are not identified.
- f. Project report preparers and recipients are not identified.

6. *SAP Worksheet #15, Reference Limits and Evaluation Tables, Page WS 15-1*

This worksheet does not appear to address EPA's concerns raised on several project action limits presented in the SAP memo. EPA's comment 21 on the SAP Memo indicated that several of the preliminary remediation goals (PRGs) identified for sediment was not considered protective for screening the sediment results. EPA recommended changing the PRGs for iron, antimony, DDD, DDE and, DDT and endosulfan sulfate; however, the SAP does not reflect this. The table below shows the differences in the SAP PRGs and EPA's recommended PRGs. EPA requests that the SAP consider using the EPA recommended PRGs or include an explanation for not changing the values to those proposed by EPA. Further, project action levels are typically presented in dry-weight, thus it is important that the results collected are also expressed in dry-weight. It is recommended that a footnote be provided where applicable that clarifies if the project action limits are presented in wet weight or dry weight.

| <b>Contaminant</b> | <b>SAP Project Action Level (mg/kg)</b> | <b>EPA Recommended Level (mg/kg)</b> | <b>Notes</b>   |
|--------------------|---|--------------------------------------|--|
| Iron               | 246,000                                 | 40,000                               | Toxic effects of iron are dependent on media pH. The recommended refinement value of 40,000 mg/kg represents a severe effects level (SEL).                                   |
| Antimony           | 27.7                                    | 25                                   | The SAP project action level is similar to EPA's recommended level the selected value of 27.7 mg/kg was determined from the toxicity tests, which have been deemed unusable. |
| DDD, DDE, DDT      | 0.05, 0.04, 0.02                        | 0.063                                | Refinement value recommended applying to total DDT which reflects the sum of DDD, DDE and DDT.   |
| Endosulfan sulfate | 0.0072                                  | 0.0054                               | Recommended refinement value for total endosulfan.   |

7. *SAP Worksheet #15, Reference Limits and Evaluation Tables, Page WS 15-13*

The SAP has not included the input parameters for the FCM for bioaccumulative compounds in worksheet 15. EPA provided to the Navy input parameters for the green heron and the mink for the FCM as part of the technical review of the sampling approach. Although this information appears to be represented in Appendix C of the SAP, this appendix is not referenced anywhere in the SAP. Include Appendix C information in the SAP Worksheet 15.

8. *SAP Worksheet #17: Sampling Design and Rationale, Page WS 17-1*

- a. As stated previously in specific comments on SAP Worksheet #10, Section 10.3 Operable Unit 1 Conceptual Site Models, EPA raised a concern that iron in ground water from OU1 landfill may be impacting downgradient wetlands (4D, 15, 18A and 18B). The relevant sections of worksheet 17 for wetlands 4D, 15, 18A and 18B should be revised to address additional analysis of iron in surface water and sediment or provide clear rationale in Worksheet #10 why iron does not require further evaluation in these wetlands. Note that this comment also applies to SAP Worksheet #18: Location-Specific Sampling Methods/SOP Requirements Table, Page WS 18-1.
- b. Fish tissue analyses have previously been performed at the site (i.e., Wetland 64) and PCB1260 was detected in the tissues at concentrations which exceeded recommended Canadian tissue guidelines. DDTx was also present in the fish but the levels did not exceed any recommended guidelines. It is recommended that the SAP include fish sampling and analysis in the current sampling approach, if it is determined that fish are present in the wetlands where fish sampling was previously performed.

9. *Worksheet #18: this Worksheet should list the sampling type and method used to collect each sample however the specific SOP to be used or sample type (e.g., hand auger, duplicate, etc.) is not listed. Although this worksheet refers the reader to Worksheet #21 for SOPs, Worksheet 21 is a master list of SOPs and is not specific to a sample. Include the sampling type and sampling method for each sample to promote clarity to the field personnel responsible for collecting the samples. Note this requirement is clearly outlined in the revised March 2012 worksheets at: <http://www.epa.gov/fedfac/documents/qualityassurance.htm>*

10. *SAP Worksheet #28: Laboratory QC Samples Table, Page WS 28-1: This table does not include the quality control (QC) samples associated with toxicity testing. The table must include lab control samples and/or reference samples. Revise Worksheet 28 to address this concern and to ensure completeness.*

11. *Figure 17-3: Wetland 15, Sample Locations, Page WS 17-4*

The proposed sampling will focus on the presumed surface-water runoff point on the south end of the wetland, and will broaden coverage within the wetland to better characterize nature and extent. However, there are no samples to confirm the contaminant concentrations in sediment of the surface water feature in Figure 17-3 in conjunction with the proposed sampling. To ensure temporal data is available from both the wetland sediment and from the

overland flow area, EPA wishes to include a sample at former location 041M1504 or a sediment location on the southern bank of the surface water feature.

### **III. EDITORIAL COMMENTS**

*1. Table of Contents, Page viii*

The following discrepancies are noted in the acronym and abbreviation list:

- a. OU is defined as “operating unit”; correct to operable unit.
- b. SIM is listed twice; the second listing is incorrect and should be removed.
- c. PAH is defined as polycyclic aromatic hydrocarbons and then is defined as polynuclear hydrocarbons for the acronym SIM-PAH. Please use one term to describe PAHs either polynuclear or polycyclic aromatic hydrocarbons.

*2. SAP Worksheet #11, Page WS 11-8:* The first complete sentence at the top of Page WS 11-8 states that the testing laboratory will compare their results to laboratory controls in accordance with the specified methods to determine if toxicity is significantly differs from their laboratory controls. Revise the end of the sentence to state “to determine if toxicity is significantly different from laboratory controls.”

*3. SAP Worksheet #24: Analytical Instrument Calibration Table, Page WS 25-1:* Each page includes a pagination error. The pagination shows WS 25-1, WS 25-2, WS 24-1, WS 24-2 and WS 24-3 when the pagination should be WS 24-1 through WS 24-5. Correct these pages to reflect the correct pagination.

*4. SAP Worksheet 19:* The header for Worksheet #19 indicates the worksheet is worksheet #20.

## **QUALITY ASSURANCE REVIEW OF SAMPLING APPROACH**

**The following comments are oriented toward the  
Quality Assurance (Checklist Review) Aspects of the sampling approach.**

### **I. GENERAL COMMENTS**

1. The rationale presented in the Sampling and Analysis Plan (SAP) for the proposed number, depths, analytes, and locations of sediment samples at each wetland is insufficiently detailed. For example, it is unclear how the number and maximum depths of the samples were selected, and how the locations of these samples are based on the previously collected samples. It is also unclear if additional sampling will be conducted if the step-out samples or deepest samples yield results above action limits. In addition, Worksheet #17 indicates that samples 041M1518, 041M1519, and 041M1520 at Wetland 15 are horizontal step-out samples to be analyzed for arsenic, but these samples appear to be step-outs for the previous sample location (041M1503) and not the proposed primary samples (see Figure 17-3). Therefore, these step-out samples should be analyzed regardless of the results of the primary samples for Wetland 15. Lastly, it is unclear why

analysis of polycyclic aromatic hydrocarbons (PAHs) is only proposed for samples collected in the northwest area of Wetland 5A, as indicated by the samples identified for this analysis at Wetland 5A in Worksheet #18 (e.g., locations 5A-09 through 5A-14), rather than all of Wetland 5A. Revise the SAP to provide greater detail for the rationale for the proposed number, depths, and locations of sediment samples and associated analytes for each wetland.

2. It is unclear if aluminum will be analyzed in samples from Wetland 18A. Section 10.3.4 states that aluminum will be analyzed to help evaluate geochemical relationships of inorganic compounds, but Worksheets #17 and #18 do not include aluminum as an analyte for Wetland 18A. Revise the SAP to clarify if aluminum will be analyzed in samples from Wetland 18A.
3. Quality control (QC) samples (e.g., matrix spike/matrix spike duplicates [MS/MSDs], field duplicates [FDs], and equipment blanks) are inconsistently identified for certain analyses and sampling phases. For example, Worksheets #12 and #20 do not indicate QC samples will be collected for total organic carbon (TOC) and acid volatile sulfide/simultaneously extracted metals (AVS/SEM) analyses. However, Worksheet #28 includes the evaluation of MS/MSDs for TOC and AVS/SEM analyses (e.g., MS/MSDs for metals and mercury and an MS for the AVS/SEM analysis). In addition, it is unclear why no QC samples are identified for Phase III sampling in Worksheet #20. Revise the SAP to consistently indicate whether MS/MSDs will be collected for TOC and AVS/SEM analyses, and to discuss why QC samples are not indicated for Phase III sampling.
4. The SAP does not provide sufficient detail regarding the management of the project files. The SAP should indicate where the project files will be stored (i.e., physical location) during the project, who will manage them, and the minimum length of time the files will be kept before archival. In addition, the SAP should clearly define where and the length of time that project files will be archived. Worksheet #14 indicates that files will eventually be transferred to the Navy, but Worksheet #29 states that some files will be stored at a third party secure professional document storage firm long-term. It is unclear what the term “long-term” means and if these files will ultimately be returned to the Navy. Lastly, the SAP indicates data will be entered and uploaded into two databases, but does not indicate that data will be verified once entered/uploaded. Revise the SAP to consistently describe the management of project files and provide greater detail.
5. Some of the standard operating procedures (SOPs) referenced in the SAP have not been provided. Worksheet #23 references the analytical SOP titled *Test Method for Particle-size of Soils (Sieve and Hydrometer Analyses)*, Revision 1, dated March 5, 2008 from Geotechnics, but this SOP is not provided in Appendix F. Also, Worksheet #21 references the SOP FT1100 *Field Measurement of Hydrogen Ion Activity (pH)*, dated March 31, 2008 (Effective December 3, 2008), but this SOP is not included in Appendix D. Revise the SAP to include these SOPs.

6. There are several inconsistencies between the numbers of samples and QC samples presented in Worksheets #18 and #20. For example, it is unclear why equipment blanks are the only QC samples identified in Worksheet #18 for Phase II and Reference sampling. Field duplicates and MS/MSDs for these two sampling events are identified in Worksheet #20. In addition Worksheet #20 identifies 18 primary samples to be analyzed for Target Analyte List (TAL) Metals, but Worksheet #18 identifies 12 samples for analysis of TAL Metals. Also, it is noted that 153 primary samples are listed for grain size analysis and 29 primary samples are listed for TOC analysis in Worksheet #20, but Worksheet #18 lists both analyses for every sample to be collected in Phase I, which appears to be a total of 147 samples in Worksheet #18. Lastly, Worksheet #18 identifies five MS/MSDs for Phase I analyses of pesticides in accordance with the frequency of MS/MSDs presented in the SAP, but Worksheet #20 indicates four MS/MSDs will be collected. Revise Worksheets #18 and #20 to ensure the numbers of samples are consistent with the samples presented in Worksheet #18.
7. It is unclear how the AVS/SEM results will be used in this investigation. Worksheet #11 indicates that if AVS is greater than the sum of SEM, metals are not indicated as bioavailable, but if the sum of SEM is greater than AVS, there is a potential for bioavailability of heavy metals into aquatic biota. However, there is no discussion of AVS/SEM results in the decision criteria and no action levels are established in Worksheet #15 for these analytes. In addition, the relationship between bioavailability and toxicity of metals is unclear. Revise the SAP to clarify how AVS/SEM results will be used in the decision process for this investigation.
8. The SAP discusses “contaminants of potential concern” and “chemicals of potential concern”. It is unclear if these terms refer to the same list of chemicals. Revise the SAP to use consistent nomenclature or clarify the difference.
9. The discussion of toxicity testing in the SAP is insufficiently detailed. For example, no QC samples, measurement performance criteria, or action levels are established in the SAP. In addition, it is unclear how toxicity data will be verified and validated. Revise the SAP to provide additional details for how the toxicity testing will be assessed.

## II. SPECIFIC COMMENTS

### 1. SAP Worksheet No. 1, Title and Approval Page

The corresponding dates associated with the approval signatures are missing. Revise Worksheet #1 to include approval signatures dates.

### 2. SAP Worksheet No. 2, SAP Identifying Information, Pages WS 2-1 through WS 2-2

This worksheet does not include the necessary scoping session dates. Revise Worksheet #2 to include the scoping session dates.

3. **SAP Worksheet No. 6, Communication Pathways, Pages WS 6-1 through WS 6-3**

This worksheet is insufficiently detailed as follows:

- a. It is unclear who has the authority to stop work due to safety issues (e.g., field team leader, field team members, etc.).
- b. It is unclear how the communications described in this worksheet will be documented and maintained.
- c. This worksheet indicates that EPA will be notified of significant corrective actions, but does not specify the timeframe for this notification.
- d. This worksheet does not indicate that EPA will be notified of significant changes to SAP procedures in the field.
- e. In addition, the top right heading for Worksheet #6 says SAP Worksheet #7.

Revise this worksheet to address the above deficiencies.

4. **SAP Worksheet No. 11, Project Quality Objectives/Systematic Planning Process Statements, Page WS 11-4**

The text indicates that a value of half the limit of quantitation (LOQ) will be used for non-detects in the calculation of background concentrations. However, substituting a specific fraction of the LOQ for analytes that are non-detect is not recommended. The most conservative approach would be to substitute the LOQ for non-detect results. Alternatively, a non-parametric approach as provided in statistical software packages could be used to establish a more accurate value for non-detect results. Revise the SAP to propose one of the approaches described above, or to provide justification for the current approach.

5. **SAP Worksheet No. 11, Project Quality Objectives/Systematic Planning Process Statements, Pages WS 11-6 to WS 11-7**

Decision Rule #4 indicates that the determination for conducting sediment toxicity sampling will be based on the results of the chemical analyses and exceedances of project action limits (PALs), and that the results will be presented to the Partnering team before implementation. Because the number of samples and chemical exceedances, the magnitude of exceedances, and the spatial distribution of exceedances that will trigger the sediment toxicity sampling is unclear, the SAP should clarify that regulatory approval is required prior to implementation. Revise this section to clarify this information.

6. **SAP Worksheet No. 12, Field Quality Control Samples, Page WS 12-1**

The footnotes indicate that duplicate values with concentrations less than five times the LOQ will be evaluated by the absolute difference between FD and parent sample, and that this difference should be less than two times the LOQ for non-metals, and less than four times the LOQ for metals. It is unclear why a larger precision allowance is made for metals. Revise the SAP to discuss why the precision of metals will be evaluated using a limit of four times the LOQ rather than the limit for non-metals.

7. **SAP Worksheet No. 15, Reference Limits and Evaluations Tables, Pages WS 15-1 to WS 15-13**

The footnotes state that LOQs and limits of detection (LODs) exceed PALs, but the partnering team has agreed to accept the data as long as results below the LOQ are reported J-flagged as estimated and the uncertainty associated with these results is discussed in the report. However, the SAP does not discuss the analytes that have detection limits (DLs) greater than the PALs (e.g., 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, and 2-chlorophenol). The SAP should discuss the uncertainty for using these data where the PAL is less than the DL and if this level of uncertainty will allow project data quality objectives (DQOs) to be met (e.g., analytes are not site contaminants of concern), or whether alternate methods were considered to achieve lower detection limits. Revise the SAP to discuss this uncertainty, why it was deemed acceptable to meet the DQOs, and whether alternative procedures were considered to lower the detection limits.

8. **SAP Worksheet No. 15, Reference Limits and Evaluations Tables, Pages WS 15-1 to WS 15-13**

PALs are not identified for many analytes and it is unclear how these compounds will be evaluated. Revise the SAP to discuss how compounds without PALs will be evaluated.

9. **SAP Worksheet No. 15, Reference Limits and Evaluations Tables, Pages WS 15-11 to WS 15-12**

It is unclear why aluminum is listed as a Pesticide/ Polychlorinated Biphenyl (PCB) in this table with different detection limits (e.g., LOQ of 10 mg/kg) than the detection limits identified on the following page (e.g., LOQ of 2 mg/kg) for saltwater sediment. Revise the SAP to resolve this discrepancy.

10. **SAP Worksheet No. 22, Field Equipment Calibration, Maintenance, Testing, and Inspection, Page WS 22-1:**

This worksheet does not include the acceptance criteria for the equipment to be used for field measurements of salinity and temperature in surface water discussed in Worksheet #14 (page 14-2). Revise Worksheet #22 to include this equipment.

11. **SAP Worksheet No. 24, Analytical Instrument Calibration Table, Pages WS 25-1 to WS 25-2**

This table includes a DDT breakdown check for semivolatile organic compounds (SVOCs)/PAHs via selective ion monitoring (SIM), but does not include the degradation breakdown check for DDT and endrin required by Method 8081. Also, it is noted that the first two page numbers in this worksheet are 25-1 and 25-2, instead of 24-1 and 24-2. Revise Worksheet #24 to include the frequency, acceptance criteria, and corrective

actions for the DDT and endrin breakdown check for Method 8081, and to correct the page numbering.

**12. SAP Worksheet No. 28, Laboratory QC Samples Table, Page WS 28-2**

The second column confirmation measurement performance criteria (MPC) have not been provided for the pesticides and PCBs analyses by Methods 8081B and 8082A. Revise this table to include the second column confirmation frequency, MPC, and corrective actions.

**13. SAP Worksheet No. 28, Laboratory QC Samples Table, Pages WS 28-3 to WS 28-8**

These tables indicate that a post digest spike (PDS) will be performed when a serial dilution fails or all analyte concentrations are less than 50 times the LOD and the acceptance limits are 75 to 125% for Methods 6020A and 6010C. However, Methods 6010C and 6020A indicate that a PDS should be performed when MS/MSD recoveries are unacceptable, and the acceptance criteria for the PDS should be 80 to 120%. Revise this worksheet to indicate that a PDS will be analyzed whenever MS/MSDs do not meet acceptance limits and use the method criteria from 6010C and 6020A.

**14. SAP Worksheet No. 28, Laboratory QC Samples Table, Pages WS 28-1 to WS 28-10**

It does not appear that all of the laboratory statistically derived QC acceptance limits have been provided. Although the SOPs provide some of these limits, all QC acceptance limits should be provided to ensure the laboratories can meet the criteria in this SAP. Revise the SAP to include laboratory statistically derived QC acceptance limits for all analytes.

**15. SAP Worksheet No. 31, Planned Project Assessments Table, Page WS 31-1**

This worksheet indicates that no audits will occur. It is unclear why audits of field sampling procedures and the laboratories performing the analyses for this investigation have not been proposed. It is recommended that laboratory audits are conducted to ensure the laboratories can produce data of sufficient quality. Additionally, it is recommended that at a minimum, one field audit is conducted at beginning of sampling activities to ensure procedures are properly implemented throughout the field effort. Revise the SAP to indicate that audits will be performed for the laboratories and at the beginning of sampling activities, and provide audit checklists indicating the items to be evaluated. Alternatively, provide a justification for the lack of field and/or laboratory audits if they will not be conducted.

**16. SAP Worksheets No. 34-36, Data Verification and Validation (Steps I and IIa/IIb) Process Table, Pages WS 36-1 to WS 36-3**

This table indicates that data validation will be performed using method specific criteria, the Department of Defense Quality Systems Manual [QSM] requirements, the National

Functional Guidelines (NFG) for Organic and Inorganic data review (dated October 1999 and October 2004, respectively), and the criteria presented in Worksheets #12, #19, and #28 of this SAP. Since multiple sources will be used for data validation procedures, a data validation checklist describing how samples will be qualified (e.g., the qualifiers that will be used, when samples will be qualified estimated/rejected, and if individual or all samples in a batch will be qualified) should be provided. Further, it is noted that outdated versions of the NFG are referenced. Revise the SAP to provide data validation checklists, and to indicate that the most recent versions of the NFG will be used.

**17. SAP Worksheets No. 34-36, Data Verification and Validation (Steps I and IIa/IIb) Process Table, Pages WS 36-1 to WS 36-3**

It is unclear if the validation personnel will be independent from data generation. Revise the SAP to clarify that the personnel performing data validation are independent from the data generation activities.

**18. SAP Worksheets No. 34-36, Data Verification and Validation (Steps I and IIa/IIb) Process Table, Page WS 36-3**

Three data qualifiers are presented as representing estimated data (I, II, and J), but it is unclear how these qualifiers differ. Revise this worksheet to clarify the difference between these three qualifiers and how each is applied to data.

**19. SAP Worksheet No. 37, Usability Assessment, Page WS 37-4**

The text states that there may be reason to use rejected data in a weight-of-evidence argument, especially when the rejected data supplements data that have not been rejected. However, rejected data are not quantifiable and should never be used for decision making. Revise the SAP to indicate that rejected data will not be used for making decisions.

### **III. MINOR COMMENTS**

**1. SAP Worksheet No. 14, Summary of Project Tasks, Page WS 14-2**

The Surface Water Measurements section references SOP FT 100, which is not provided in Appendix D or discussed elsewhere. Revise the SAP to resolve this discrepancy.

**2. SAP Worksheet No. 23, Analytical SOP References Table, Page WS 23-2**

The acronym for inductively coupled plasma atomic emission spectrometry is incorrectly presented as ICP-MS. Revise this acronym to ICP-AES.

**USEPA**  
**REGION 4 SUPERFUND DIVISION**  
**FINAL Uniform Federal Policy QAPP CHECKLIST 2008**

**QAPP Title:** Draft Sampling and Analysis Plan, Wetland Sediment Sampling, Operable Unit 16 - Site 41

**Project Location:** Naval Air Station Pensacola; Pensacola, Florida

**Originating Organization:** Resolution Consultants

**QAPP Date:** September 2012

**Receipt Date:**

**Review Date:**

**Reviewer:**

**EPA Regional Project Manager:** Tim Woolheater

**EPA Project Officer:**

☐ Yes - Indicates that the topic/element was covered in sufficient detail to meet EPA's requirements as specified in this checklist.

☐ No - Indicates that the topic/element covered in the QAPP does not provide sufficient detail to meet EPA's requirements or the topic is entirely missing from the document.

| Element  | Meets Requirements   |
|--|--|
| <b>Title and Approval Page</b><br><b>Worksheet 1</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  |
| Title of QAPP<br><b>Worksheet 1</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Organization=s Name: The name of the Lead organization, the name of the organization preparing the QAPP, and the name of the organization conducting the project (if different from preparer). For Federal Facilities, the Lead Organization is the Facility (DOD, DOE).<br><b>Worksheet 1</b> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Dated Signatures: Investigative Organization=s Project Manager, Investigative Organization's QA Officer, and Lead Organization's Project Manager.<br><b>Worksheet 1</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div style="border: 1px solid red; padding: 2px; color: red;">Signatures are not dated.</div> |

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| Date and Signature of Quality Assurance Manager=s approval for the Lead Organization.<br><b>Worksheet 1</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Date and Signature of USEPA Quality Assurance Manager or Designated Approving Official<br><b>Worksheet 1</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  |
| <b>QAPP Identifying Information</b><br><b>Worksheet 2</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div style="border: 1px solid red; padding: 2px; color: red;">         Dates of scoping sessions not included.       </div> |
| <b>Distribution List: Including Addresses of all entities or agencies requiring copies of the QAPP</b><br><b>Worksheet 3</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Project Personnel Sign-Off Sheet:</b><br>Identifies key project personnel and specifies technical disciplines.<br><b>Worksheet 4</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Project Organizational Chart:</b> Organization chart provided: Depicts lines of authority, independence (of QA manager), and reporting responsibilities. Org- chart also contains entries for all agencies, contractors and individuals responsible for performing QAPP preparation, sample collection, laboratory analysis, data verification, review and validation, data quality assessment; and project oversight responsibilities.<br><b>Worksheet 5</b> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Communication Pathways:</b> Details their roles/responsibilities and details communication pathways.<br><b>Worksheet 6</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  |
| <b>Personnel Responsibilities and Qualifications Table</b><br><b>Worksheet 7</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |

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| <b>Special Training Requirements and Special Certifications</b><br><b>Worksheet 8</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Identifies how training needs are determined and lists all training requirements for the project. Specifies whether certain professionals require a license or certification to perform duties as required by federal or state laws.<br><b>Worksheet 8</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Project Scoping Session Participants</b><br><b>Worksheet 9</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Problem Definition/Background</b><br><b>Worksheet 10</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Clearly states the particular environmental problem to be solved, decision to be made, or outcome to be achieved. Include sufficient background information to provide a historical, scientific, and regulatory perspective for this particular project.<br><b>Worksheet 10</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Provides historical and background information concerning prior environmental investigations or assessments performed at the site. Discusses the data collected from these prior investigations and identifies any additional information that may be contained in computer databases (secondary data), etc.<br><b>Worksheet 10</b>              | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Project Quality Objectives/Systematic Planning Process Statements</b><br><b>Worksheet 11</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  |
| Provides the Data Quality Objectives in accordance and compliance with EPA=s Data Quality Objective Process (EPA-QA/G-4) document. Lists the seven steps of the DQO process and provides the project-specific information pertaining to each of these steps. Applies a systematic planning process to the project study undertaken. Provides the | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br><div style="border: 1px solid red; padding: 5px; color: red;"> Decision statements are unclear and do not address AVS/SEM. </div> |

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| <p>qualitative and quantitative data quality objectives for all aspects of the project. Must provide clearly delineated project objectives such as determining the presence/absence of potential contaminants, nature and extent of contamination, determining whether human health is affected. Must provide a list of decisions and alternative actions (remediation, removal, further assessments, no further action, etc.).</p> <p><b>Worksheet 11</b></p> |   |
| <p><b>Measurement Performance Criteria Table</b></p> <p><b>Worksheet 12</b></p>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| <p>Identifies the data quality indicators, measurement performance criteria, and QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems.</p> <p><b>Worksheet 12</b></p>   | <div style="text-align: right;"><input checked="" type="checkbox"/> Yes    <input type="checkbox"/> No</div> <div style="border: 1px solid red; padding: 5px; margin-top: 10px; color: red;">Unclear why precision requirements for metals and non-metals differ.</div> |
| <p><b>Secondary Data Criteria and Limitations Table</b></p> <p><b>Worksheet 13</b></p>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| <p>Identifies the type and frequency of non-direct measurement techniques for the project (for computer databases, literature searches, etc.)</p> <p><b>Worksheet 13</b></p>   | <div style="text-align: right;"><input checked="" type="checkbox"/> Yes    <input type="checkbox"/> No</div>  |
| <p>Clearly identified and describes the limitations of such data.</p> <p><b>Worksheet 13</b></p>   | <div style="text-align: right;"><input checked="" type="checkbox"/> Yes    <input type="checkbox"/> No</div>  |
| <p>Discusses the rationale for using this data and explains its relevance to the project.</p> <p><b>Worksheet 13</b></p>   | <div style="text-align: right;"><input checked="" type="checkbox"/> Yes    <input type="checkbox"/> No</div>  |

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| Specifies how limitations in this data will be communicated to all end data users and stakeholders.<br><b>Worksheet 13</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Summary of Project Tasks</b><br><b>Worksheet 14</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Provides a summary of all work to be performed, products to be produced, data and management assessment. Lists the actual measurements to be made: Including in-situ field measurements, fixed laboratory measurements, or any other type of information collected as part of the project.<br><b>Worksheet 14</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Reference Limits and Evaluation Table</b><br><b>Worksheet 15</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Cites applicable regulatory standards or criteria such as action limits, ARARs, PRGs, MCLs, risk assessment screening levels, etc. Must provide the actual numerical criteria for the above items. Provides all regulatory standards/criteria as part of DQO process (action limits, ARARs, PRGs, MCLs, etc.) on an analyte by analyte basis.<br><b>Worksheet 15</b> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br><div style="border: 1px solid red; padding: 5px; margin-top: 10px; color: red;">Does not discuss analytes with PALs that are less than DLs and how analytes without PALs will be evaluated.</div> |
| Provides a list of all the critical contaminants/analytes along with their respective detection limit requirements (for chemical parameters) and quantitation limit.<br><b>Worksheet 15</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Project Schedule\Timeline Table</b><br><b>Worksheet 16</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Provides work schedule for all tasks including report preparation, response to comments, etc.<br><b>Worksheet 16</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |

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| Identifies all required reports, records, data reports, quality assurance reports/documents.<br><b>Worksheet 16</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| <b>Sampling Design and Rationale</b><br><b>Worksheet 17</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| Provides design of the sampling/collection network.<br><b>Worksheet 17</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Provides an extensive discussion regarding the rationale for the sampling design. (This also includes a discussion regarding the rationale and relevance of the analytical program).<br><b>Worksheet 17</b>                    | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div style="border: 1px solid red; padding: 5px; color: red;">Rationale for number, depths, analytes, and locations of samples is insufficiently detailed.</div> |
| <b>Sampling locations and Methods/SOP Requirements Table</b><br><b>Worksheet 18</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Provides a table with type and number of samples required for collection such as surface, subsurface, or groundwater.<br><b>Worksheet 18</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Provides maps or diagrams with sample locations/collection locations and provides table with frequency of sampling events.<br><b>Worksheet 18</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Provides the sample matrices slated for collection in the sample table (surface soil, subsurface soil, sediment, surface water, groundwater samples, etc).<br><b>Worksheet 18</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| <b>Analytical SOP Requirements Table</b><br><b>Worksheet 19</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| Clearly identifies the extraction, digestion, analytical methodologies (provides the actual method numbers) to be followed (includes all relevant options or modifications required), identifies the required instrumentation. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |

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| <p>Include copies of the SOPs as attachments or reference in the QAPP.</p> <p><b>Worksheet 19</b></p>  | <div style="border: 1px solid red; padding: 5px; color: red;">SOP from Geotechnics is not provided in Appendix F.</div>   |
| <p>Provides table listing sample container requirements and preparation requirements for these containers (if provided by laboratory, clearly states such).</p> <p><b>Worksheet 19</b></p> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| <p>Provides table listing sample preservation requirements (for chemical parameters) and holding time criteria (where applicable).</p> <p><b>Worksheet 19</b></p>                          | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| <p><b>Field Quality Control Sample Summary Table</b></p> <p><b>Worksheet 20</b></p>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div style="border: 1px solid red; padding: 5px; color: red;">Sampling frequencies appear inaccurate and do not match WS#18.</div> |
| <p><b>Project Sampling SOP Reference</b></p> <p><b>Worksheet 21</b></p>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| <p>Identifies all instruments/equipment needed to conduct project.</p> <p><b>Worksheet 21</b></p>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| <p>Provides the required field sample collection procedures, protocols and methods.</p> <p><b>Worksheet 21</b></p>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div style="border: 1px solid red; padding: 5px; color: red;">SOP FT1100 is not provided in Appendix D.</div>                      |
| <p>Provides a list of sampling/collection equipment (including make and model of equipment).</p> <p><b>Worksheet 21</b></p>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| <p>Identifies on-site support facilities that are available to field staff.</p> <p><b>Worksheet 21</b></p>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| <p>Identifies key study personnel in charge of or overseeing sampling/collection activities.</p> <p><b>Worksheet 21</b></p>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| <p>Describes equipment decontamination procedures and requirements. Discusses whether sampling equipment is dedicated or non-dedicated.</p> <p><b>Worksheet 21</b></p>                     | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |

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| <b>Field Equipment Calibration, Maintenance, Testing and Inspection Tables</b><br><b>Worksheet 22</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| Provides a list of all in-situ testing instruments and field equipment.<br><b>Worksheet 22</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div style="border: 1px solid red; padding: 2px; color: red;">Appears to be missing equipment to measure temperature and salinity.</div> |
| Provides the technical criteria by which the field instruments or sampling equipment is checked for acceptable performance.<br><b>Worksheet 22</b>                                 | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Provides a comprehensive list of the supplies required for the project.<br><b>Worksheet 22</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| Identifies the individual(s) responsible for checking and inspecting consumables and supplies.<br><b>Worksheet 22</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Provides the acceptance criteria for consumable items, instruments, and equipment.<br><b>Worksheet 22</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Describes equipment and corrective maintenance practices to ensure that on-site equipment or instruments are performing within the required specifications.<br><b>Worksheet 22</b> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Identifies the availability and location of spare parts.<br><b>Worksheet 22</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |

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| <b>Analytical SOP Reference Table</b><br><b>Worksheet 23</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| List all SOPs that will be used to perform on-site or off-site analysis. Indicate whether the procedure produces screening or definitive data. Sequentially number analytical SOP references in the Reference Number column. Include copies of the SOPs as attachments or reference in the QAPP. The reference number can be used throughout the QAPP to refer to a specific SOP.<br><b>Worksheet 23</b> | <div style="text-align: right;"><input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No</div> <div style="border: 1px solid red; padding: 5px; margin-top: 10px; color: red;"> SOP from Geotechnics is not provided in Appendix F. </div>                |
| <b>Analytical Instrument Calibration Table</b><br><b>Worksheet 24</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| Identifies all equipment requiring calibration and discusses the frequency of calibration<br><b>Worksheet 24</b>   | <div style="text-align: right;"><input checked="" type="checkbox"/> Yes    <input type="checkbox"/> No</div>  |
| Identifies the calibration requirements for each instrument requiring calibration. (For fixed laboratory this may be in the SOPs or QA manual).<br><b>Worksheet 24</b>   | <div style="text-align: right;"><input checked="" type="checkbox"/> Yes    <input type="checkbox"/> No</div>  |
| Provides the calibration requirements and calibration acceptance criteria for each type of equipment or instrument. (Again for the off-site laboratory this information will reside in the method-specific SOPs and the QA manual).<br><b>Worksheet 24</b>   | <div style="text-align: right;"><input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No</div> <div style="border: 1px solid red; padding: 5px; margin-top: 10px; color: red;"> Does not include breakdown check for DDT and endrin (Method 8081). </div> |
| Identifies the type of documentation required for calibrations and instrument checks and discusses how calibrations are traced back to specific instruments for each analytical parameter. (Once again for the off-site laboratory this information will reside in the method-specific SOPs and the QA manual).<br><b>Worksheet 24</b>   | <div style="text-align: right;"><input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No</div>  |

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| <b>Analytical Instrument and Equipment Maintenance, Testing, and inspection Table</b><br><b>Worksheet 25</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Identifies all analytical instrumentation that requires maintenance, testing, and inspection and provide the SOP reference number for each. In addition, document the frequency, acceptance criteria, and corrective action requirements.<br><b>Worksheet 25</b> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Provides a comprehensive list of the consumables such as, solvents, reagents, buffer solutions and other consumables or supplies required for the project.<br><b>Worksheet 25</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Provides the acceptance criteria for each of these items.<br><b>Worksheet 25</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Identifies those individual(s) responsible for checking/inspecting supplies and consumables.<br><b>Worksheet 25</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| <b>Sample Handling</b><br><b>Worksheet 26</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Provides a detailed description of the procedures for post sample handling (once the sample has been collected).<br><b>Worksheet 26</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| <b>Sample Custody Requirements</b><br><b>Worksheet 27</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Provides a detailed description of the chain-of-custody procedures.<br><b>Worksheet 27</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

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| <b>QC Sample Table</b><br><b>Worksheet 28</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| Identifies the type, number and frequency of procedures and frequency of QA/QC sample collection along with the required QC statistically derived limits for each analyte (for spike samples, internal standards, surrogate spikes).<br><b>Worksheet 28</b>                             | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div>The laboratory statistically derived control limits are not provided for all methods.</div> |
| Provides the statistical equations for accuracy, precision, and comparability. Specifies the acceptance criteria for these measurements.<br><b>Worksheet 28</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br><div>This information is presented in Worksheet #37.</div>                                       |
| <b>Project Documents and Records Table</b><br><b>Worksheet 29</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| Provides a comprehensive list of the documents and records required for this project (including raw data, field logs, audit reports, QA reports, progress or status reports, analytical data reports, data validation reports/data quality assessments reports.)<br><b>Worksheet 29</b> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Describes the record-keeping, archival and retrieval requirements for hard-copy and electronic information produced during the course of the project.<br><b>Worksheet 29</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br><div>Included in WS #14.</div>   |
| Provides assessment checklists or other standardized forms in an appendix to the QAPP.<br><b>Worksheet 29</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| Provides the retention time and location of study records, reports and formal documents.<br><b>Worksheet 29</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div>Discusses multiple archive locations.</div>   |
| Describes data handling equipment and procedures used to process, compile and   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |

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| <p>analyze data (provides a complete list of computer hardware and software needs) - Specifies whether computer databases will have restricted access or will be password protected Discusses how the accuracy of computer databases is assured.</p> <p><b>Worksheet 29</b></p> | <div>Included in WS #14.</div>  |
| <p>Describes process for assuring that applicable Office of Information Resource Management requirements are satisfied (mainly this is required if the data will be entered into an EPA or other Federal Database)</p> <p><b>Worksheet 29</b></p>                               | <div><input type="checkbox"/> Yes <input type="checkbox"/> No</div> <div>Not Applicable</div>                                   |
| <p><b>Analytical Services Table</b></p> <p><b>Worksheet 30</b></p>  | <div><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</div>  |
| <p>Provides validation criteria for non-standard or unpublished methodologies proposed for use for a given study.</p> <p><b>Worksheet 30</b></p>  | <div><input type="checkbox"/> Yes <input type="checkbox"/> No</div> <div>Not Applicable</div>                                   |
| <p>Identifies individual(s) responsible for overseeing the success of the analysis and for implementing corrective actions if deemed necessary.</p> <p><b>Worksheet 30</b></p>  | <div><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</div>  |
| <p>Specifies the turnaround time for hardcopy and electronic laboratory data deliverables.</p> <p><b>Worksheet 30</b></p>   | <div><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</div>  |
| <p><b>Planned Project Assessment Table</b></p> <p><b>Worksheet 31</b></p>   | <div><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</div>  |
| <p>Lists the required number, frequency and type of assessments with approximate dates and names of individual(s) responsible for performing these assessments.</p> <p><b>Worksheet 31</b></p>  | <div><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</div> <div>Indicates no assessments are planned.</div> |
| <p>Discusses one or more of the following types of assessments: peer reviews, technical audits, surveillance, management system reviews, readiness reviews, quality system audits, performance evaluations, data quality</p>  | <div><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</div> <div>Indicates no assessments are planned.</div> |

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| assessments.<br><b>Worksheet 31</b>   |   |
| <b>Assessment Findings and Corrective Action Responses</b><br><b>Worksheet 32</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |
| Identifies the individual(s) performing these assessments and discusses the authority and independence of these individual(s) in relation to those being assessed.<br><b>Worksheet 32</b>                                 | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div style="border: 1px solid red; padding: 5px; margin-top: 5px;">Indicates no assessments are planned.</div> |
| Provides a description of the types of corrective actions that may be instituted to resolve any issues identified during the audit.<br><b>Worksheet 32</b>  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div style="border: 1px solid red; padding: 5px; margin-top: 5px;">Indicates no assessments are planned.</div> |
| Discusses where assessment findings will be documented and how the assessment findings will be communicated to all key project staff, state and EPA personnel responsible for the study oversight.<br><b>Worksheet 32</b> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br><div style="border: 1px solid red; padding: 5px; margin-top: 5px;">Included in WS #6.</div>                    |
| <b>QA Management Report Table</b><br>Identifies the frequency and distribution of the following types of reports:<br><b>Worksheet 33</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Project Status Reports<br><b>Worksheet 33</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Results of Assessments or Audits<br><b>Worksheet 33</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Results of periodic Data Quality Assessments<br><b>Worksheet 33</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| QA Audit Reports<br><b>Worksheet 33</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |
| Identifies the individual(s) responsible for preparing, reviewing and receiving these reports - discusses the retention time for maintaining such reports.  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No   |

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| <b>Worksheet 33</b>  |  |
| <b>Verification (Step I) Process Table</b><br><b>Worksheet 34</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Identifies the guidance documents or SOPs governing the data review, verification and validation processes.<br><b>Worksheet 34</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Validation (Steps IIa and IIb) Process Table</b><br><b>Worksheet 35</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  |
| Clearly discusses the criteria by which data will be accepted or rejected and provides a comprehensive list of the data flags or qualifiers that will be assigned to non-compliant data points (including the definitions for each of these flags).<br><b>Worksheet 35</b> | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div style="border: 1px solid red; padding: 5px; color: red; margin-top: 10px;"> Provides multiple sources for data validation and presents three qualifiers for estimated data. No data validation checklists provided. </div> |
| Describes the process, and provides the criteria by which the data will be assessed for its overall usability and intended purpose.<br><b>Worksheet 35</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Validation (Steps IIa and IIb) Summary Table</b><br><b>Worksheet 36</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| <b>Usability Assessment</b><br><b>Worksheet 37</b>   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  |
| Describes the process by which the on-site and off-site analytical data will be reconciled to the project-specific requirements.<br><b>Worksheet 37</b>  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Discusses how limitations in the final data set will be documented and communicated to all end data users and stakeholders.<br><b>Worksheet 37</b>   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |

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| Describes the circumstances under which data would be rejected and removed from the final data set.<br><b>Worksheet 37</b>     | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><div style="border: 1px solid red; padding: 5px; color: red;">Indicates rejected data may be used in weight-of-evidence argument.</div> |
| Identifies the individual(s) responsible for reconciling the data to the project-specific requirements.<br><b>Worksheet 37</b> | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |
| Identifies the SOP or guidance document outlining the data usability process.<br><b>Worksheet 37</b>                           | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No  |

**Note:** EPA=s guidance and requirements documents for the DQO process, QAPP preparation, Data Validation and Data Quality Assessments, are located at [www.epa.gov/quality](http://www.epa.gov/quality) and [http://www.epa.gov/fedfac/pdf/ufp\\_wbk\\_0305.pdf](http://www.epa.gov/fedfac/pdf/ufp_wbk_0305.pdf). These documents include:

**Final QAPP Disposition:**

☐ *Approved, no comments*

☐ *Not Approved, Address Comments, Submit Revised QAPP to the EPA Designated Approval Official*

Signature of Designated Approval Official (DAO)

Signature of Section Chief of the DAO

**Reference**

1. Intergovernmental Data Quality Task Force Workbook for Uniform Federal Policy for Quality Assurance Project Plans Part 2A: UFP-QAPP Workbook (EPA-505-B-04-900C) found at <http://www.epa.gov/fedfac/documents/qualityassurance.htm>